Navy Industrial Hygiene Staffing Formula Review

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NEHC Conference

March 2006

Acknowledgements:

Mark Lesko,
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NAVMEDCEN
Portsmouth

Objectives

- Review History of Existing Formula
- Propose Modifications to Formula
- Discuss Potentially Significant Errors
- Gap Analysis
- Recommendations for Further Improvement

Staffing Guide History & Development

- 1983 OPNAVINST 5100.23B

  Initially Based upon Dec 1982 JRB study (Lawton, Phillips, & McRaney)

- 1993 OPNAVINST 5100.23C Ch-1

  Current Based upon Jun 1992 SAIC Validation Study (Phillips & McRaney)

- 2005 Review of Staffing Guide

  Proposed Based actual field data

1982 Study

- Index of Workload:
  - Worker employment (numbers of workers)
  - Other measures were considered but rejected due to the lack of uniform & reliable information sources upon which to base staffing projections.
- Based upon two major assumptions:
  - Workload varies according to the type of industrial activity
  - Reasonable estimates can be made of the tasks required to support a given population

1982 Study: Assignment of Activity Risk Category

- Data Driven: Percent of workers in clearly industrial occupations
- Data Driven: Occupational injury & illness rates
- Subjective: Extent to which chemicals are used & physical agents generated
- Subjective: Complexity of work environment with regard to controls

Developed scoring bands and assigned a *Risk Category*

1982 Study: IH Task Analyses

- Using methods similar to those used currently by HSO and 1742 hours per person per year
- Identified major tasks with an estimate of the amount of time needed to conduct the tasks for several representative commands: shipyard, industrial activity, moderately industrial, low industrial
  - IH surveys & exposure monitoring
  - Training
  - Consultations
  - Audits (negligible amounts)
  - Administrative (travel, personnel, professional development)

1983 Staffing Guide (23B)

$Y_1 = 0.000723X_1 + 0.00088X_2 + 0.000909X_3 + 0.000311X_4$

$Y_2 = 0.001602X_1 + 0.001111X_2$

Y_1= MTF Industrial hygiene staff

Y_2= Workplace monitoring staff (non-MTF personnel)

Where X_1 X_2 X_3 X_4 are the numbers of workers in the various risk categories of commands, e.g., X_1 is the number of workers in a shipyard and X_3 might represent the number of workers at a Naval Air Station

1992 Validation Study

- BUMED *IH staffed at approx. 60%* of 1983 guide which triggered **concern over validity** of the model
- Existing staffing *levels varied widely*
- **Policy change** *significantly altered workload* (Workplace monitoring reverted back to MTF IH staff which dropped staffing levels to approx. 51% of recommended)
- Policy still has **annual survey requirement**

1992 Validation Study (continued)

- Recognized a minimum IH effort needed to maintain support regardless of size
- Noted the difficulty in predicting workload for ships requests versus scheduled surveys ~ true today?
- No adequate way to measure workload completion:
  - Recognized value of *reports as primary indicator* of productivity (noted variable scope & format)
  - Noted shortcomings: program evaluation versus exposure assessment
  - Noted inadequate sampling data

1992 Validation Study (continued)

- Continue basing staffing levels on population & hazard category!
- Still used estimations of the time needed to complete work tasks.
- Adjusted formula:
  - Altered industrial categories from 4 to 3
  - Recognized fleet support & added ship component ~ **S**
  - Added Aircraft Operating Forces ~ **E** ; Students ~ **F**

1992 Staffing Guide (23C-Ch.1)

IH = 0.002A + 0.0008B + 0.0004C + 0.0004E + 0.0004F +

0.004L + S

Where A, B, C are various command risk categories

E = number of aircraft operating forces

F = number of students

L = number of activities (locations) supported

S= support to ships (formula derived based upon type ship)

1992 Staffing Guide (continued)

$$S = 0.87CV + 0.87AS + 0.35LH + 0.17CGN$$

$$+ 0.13DD + 0.087(FF + AM + AO + AT)$$

$$+ 0.044SS + 0.022OT$$

Classes of ships

CV= *CV or CVN*

AS= *AS*

LH= *LHA, LHD, or LPH*

CG= *CGN*

DD= *DD, CG, or DDG*

FF= *FF or FFG*

AM= *LPD, LSD, LST, AGF or LCC*

AO= *AO, AOE, AE, AOR, or AFS*

AT= *ARS or ATS*

SS= *SSN or SSBN*

OT= *Not listed in any other category*

Reasons to Revisit Existing Industrial Hygiene Staffing Guide

- **Navy perception that the existing Navy model is broken**
- **Existing Navy model not being utilized**
- Major change in survey periodicity (~ workload) since existing model was developed
- Initiation of Army/DOD model study and other studies which affect staffing needs and projections

Proposed Revision to Industrial Hygiene Staffing Guide

- Based upon actual timekeeping data over 2-4 year period

- Computations for a wide variety of commands
  Cat A ; Cat B; Cat C; Cat E; & SHIPs ?
- Computations for large number of commands; > 100

- Computations done on actual populations surveyed

- Adjustment for survey periodicity

Make things as simple as possible and no simpler

~Albert Einstein~

Methodology

$$Staff = facto * populatio$$

$$\frac{\sum \#hours}{hours / manyear} = facto * populatio$$

Proposed Navy Industrial Hygiene Staffing Guide

IH = 0.0017A + 0.0006B + 0.0003C + 0.0003E + 0.0003F + S*

Where A, B, C are various command risk categories

E = number of aircraft operating forces

F = number of students

S= support to ships (formula derived based upon type ship)

* Initial data suggests modifications needed

Comparison: Current/Proposed

Category	A	Pop. Served	B	Pop. Served	C	Pop. Served
Current	0.002	500	0.0008	1250	0.0004	2,500
Proposed	0.0017	588	0.0006	1667	0.0003	3,333
Overall decrease	~15%		~25%		~25%	

Significant Sources of Potential Errors

- Inaccurate population figures
- Inappropriate activity risk category
- IH survey periodicity
- Inaccurate determination of workload completion
- Undefined AOR in predicting workload

GAP Analysis

- Existing formula 100%
- Proposed formula reduces ~20% 80%

- Workload shortfalls ~25% 55%
  - IH surveys
  - Sampling
- Significant potential 'errors'~10% to 20% 45%

- Current staffing levels 42%

Conclusions & Recommendations

- Continue Population & Hazard category approach
- Simple and predictive to apply
- Revise the existing formula & APPLY
- Sanction limited local adjustments to formula
- Minimize sources of potentially significant error
  - Population figures; AOR; hazard category
- Continue developing measure of workload (metrics)
  - Reflect workload completed/not completed; improve validation
- Expand data collection
  - Ultimately, introduce uniform ‘timekeeping’ throughout Navy IH
- Staffing to cover ships needs establishment of AOR

QUESTIONS ?

Comparison to Army Model

- Direct comparison difficult because data not collected the same way
- Business practices different among services
- Army model at the stage of development as the 1982/1992 studies
- Army model less reliant on task analysis from a predictive stand point
- Significant gap noted in Army model regarding IH sampling